Past and Future Implications of Near-Misses and Their Emotional Consequences

Qiyuan Zhang and Judith Covey

Durham University UK

Author Note

Correspondence should be addressed to Dr Judith Covey, Department of Psychology, Wolfson Research Institute, Durham University, Queen's Campus, Stockton-on-Tees TS17 6BH, UK. j.a.covey@durham.ac.uk; Tel +44 (0)191 334 0104; Fax +44 (0)191 334 0006

Abstract

The Reflection and Evaluation Model (REM) of comparative thinking predicts that temporal perspective could moderate people's emotional reactions to close counterfactuals following near-misses (Markman & McMullen, 2003). The experiments reported in this paper tested predictions derived from this theory by examining how people's emotional reactions to a near-miss at goal during a football match (Experiment 1) or a close score in a TV game show (Experiment 2) depended on the level of perceived future possibility. In support of the theory it was found that the presence of future possibility enhanced affective assimilation (e.g., if the near-miss occurred at the beginning of the game the players who had nearly scored were hopeful of future success) whereas the absence of future possibility enhanced affective contrast (e.g., if the near-miss occurred at the end of the game the players who had nearly scored were disappointed about missing an opportunity). Furthermore the experiments built upon our theoretical understanding by exploring the mechanisms which produce assimilation and contrast effects. In Experiment 1 we examined the incidence of present-oriented or future-oriented thinking, and in Experiment 2 we examined the mediating role of counterfactual thinking in the observed effect of proximity on emotions by testing whether stronger counterfactuals (measured using counterfactual probability estimates) produce bigger contrast and assimilation effects. While the results of these investigations generally support the REM, they also highlight the necessity to consider other psychological mechanisms (e.g., social comparison), in addition to counterfactual thinking, that might contribute to the emotional consequences of near-miss outcomes.

Keywords: close counterfactuals; near-miss; contrast effect; assimilation effect; temporal perspective; the Reflection and Evaluation Model.

Past and Future Implications of Near-Misses and Their Emotional Consequences

The sense that "something was close to happening" is a powerful psychological phenomenon. A good illustration is the study by Kahneman and Tversky (1982), where Mr Tees, who missed his flight by five minutes, was judged by 96 percent of participants to be more upset than Mr Crane, who missed by half an hour. Markman and McMullen' (2003) Reflection and Evaluation Model (REM) of comparative thinking proposes two distinctive psychological experiences that follow near-misses.

Affective contrast arises when people generate counterfactual representations (i.e, how things could have been different) after near-misses and use them as comparison standards to evaluate their current standings (Markman, Gavanski, Sherman, & McMullen, 1993; Roese, 1994, 1997). Thus, being close to a desirable outcome worsens one's mood by bringing about frustration or disappointment. In the same way, being close to an undesirable outcome improves one's mood by bringing about relief or thankfulness. Evidence for this contrast effect comes from Medvec and Savisky (1997), who demonstrated a "satisfaction reversal": students whose exam score was close to a higher grade boundary reported less satisfaction than those whose score was in the same grade but close to the lower grade boundary (see also Macrae, Milne, & Griffiths, 1993; Medvec, Gilovich, & Madey, 1995; Meyerslevy & Maheswaran, 1992; Miller & McFarland, 1986).

In comparison, affective assimilation arises when people experience the counterfactual as if it were true (Markman & McMullen, 2003; McMullen, 1997; McMullen & Markman, 2000). To illustrate, McMullen (1997, p.78) cited a real-life incident in which passengers who switched their flight and missed a fatal air-crash

reported mainly negative emotions towards their lucky escape. The narrow escape and counterfactual entailed (e.g., "I could have been killed") appears to have led to negative rather than positive emotions (e.g., fearfulness).

According to the REM, a number of factors influence the relative strengths of contrast and assimilation effects including temporal perspective. If "an event is perceived as a final or completed event" (Markman & McMullen, 2003, p.256), the future possibility to change the outcome is closed and people are encouraged to focus on the past (e.g., "I could have got a higher/lower grade but I didn't"). This should evoke *evaluative* simulation, enhance the contrast effect and bring about disappointment or relief. In contrast, if an event is perceived "as part of a series of events that will continue into the future", the future possibility to change the outcome remains open and people are encouraged to focus on the future (e.g., "I could have got a higher/lower grade and I will next time"). This should evoke *reflective* simulation, enhance the assimilation effect and bring about hopefulness or fearfulness.

Although McMullen and Markman (2002, Study 2) provided evidence for this proposition it is open to alternative explanations. Participants were provided with a play-by-play account of one half of a basketball game. The teams ended up with very close scores or scores far apart. Affective contrast was observed when participants were told they were reading about the second half (low future possibility) –e.g., the supporters of the losing team reported worse moods if the scores were close than if it was a blowout. However, the reverse was found when participants were told they were reading about the first half (high future possibility), suggesting affective assimilation. Also intriguingly, they found that the assimilation effects at half-time were strong

enough to cause the team which was 1-point ahead to feel worse than the team which was 1-point behind – thereby producing an "assimilation-based satisfaction reversal".

Although these results support the temporal perspective hypothesis, there are doubts whether the differences in affect between the close and far conditions as well as the satisfaction reversal found at half-time were truly caused by *counterfactual-based* assimilation effects. According to McMullen and Markman (2002) counterfactual alternatives are more readily apparent in close situations because it is easier to see how things could have turned out differently. Hence, the team that is only 1-point down at half-time is more likely to see an opportunity to win and the team that is only 1-point ahead sees more of a threat. However, two features unrelated to the activation of counterfactuals may have contributed to heightened expectations of winning (or losing) in the close condition.

Firstly, by presenting a play-by-play account of the game McMullen and Markman (2002) may have unintentionally created different perceptions of velocity in the close and far conditions. Participants may have drawn inferences from the changing scores throughout the half that the players were more likely to be on a trajectory towards winning (or losing) in the close condition. Secondly, heightened expectations might also have been caused by the players' *objective proximity* to future winning or losing because the score from the first half will be carried over to the second half. Thus, the team which was 1-point behind (or ahead) at half-time would have a smaller gap to close (or defend) between their score and the opponent's in the second half and were therefore *objectively* more likely to win (or lose) the game. Hence, the differences in affect between the close and blowout conditions and the satisfaction reversal could have

had little to do with *counterfactual* thinking – being 1-point ahead (or behind) at half-time feels worse (or better) than being 15-points ahead simply because there is an objectively higher chance of losing (or gaining) the lead in the second half.

The existing evidence for the enhancement of affective assimilation in the presence of future possibility is therefore open to alternative explanations. The two experiments reported here eliminated these alternatives by avoiding the confounding effects of both perceived trajectory and objective proximity. The experiments therefore provide superior tests of the REM's predictions.

In both experiments we tested whether the overall effect of proximity on affect in winning and losing situations (path *c* in Figure 1a) depends on the perception of future possibility: The contrast effect will be enhanced when future possibility is low (i.e., winning by a small margin will be more pleasurable and losing by a small margin will be more disappointing), whereas the assimilation effect will be enhanced when future possibility is high (i.e., winning by a small margin will be less pleasurable and losing by a small margin with be less disappointing).

FIGURE 1 ABOUT HERE

Experiment 1 also examined the temporal focus of people's thoughts. This allowed us to explore the mechanisms which produce assimilation effects (i.e., in the presence of future possibility we expected a higher incidence of future-oriented thinking) and contrast effects (i.e., in the absence of future possibility we expected a higher incidence of past-oriented thinking).

A different method for exploring the mechanisms was adopted in Experiment 2 by examining whether the effect of proximity on emotions could be explained by the mediating role of counterfactual probability estimates – i.e., *how likely* things could have turned out differently (denoted by path *ab* in Figure 1b), and whether the nature of this mediation is moderated by people's perception of future possibility. Investigating counterfactual probability estimates departs from the traditional method of measuring counterfactual thinking by counting the frequency of counterfactual statements generated in free-style thought listing tasks (e.g., Markman et al., 1993; Meyerslevy & Maheswaran, 1992; Roese & Olson, 1996, 1997). However, estimates have been shown to be a stronger predictor for emotions than counterfactual frequency and they therefore provide a reliable measure of counterfactual potency (Petrocelli, Percy, Sherman, & Tormala, 2011). Establishing their mediating role therefore provides more direct evidence of the role of counterfactual thinking in shaping people's emotions.

Experiment 1

The first experiment compared the emotional consequences of a near-miss goal scoring incident that occurred either at the beginning or end of a soccer match. We predicted that when the near-miss occurred at the end participants would judge that the attackers who nearly scored a goal would feel worse than the defenders who nearly conceded. This is because there is little time left for a goal to be scored (low future possibility) and the players are more likely to dwell on the past implications of the counterfactual which promotes affective contrast - the attackers feel disappointed in missing an opportunity whereas the defenders feel relieved in averting a misfortune. Nonetheless, this pattern should be reversed when the near-miss occurred at the beginning. This is because there is plenty of time left for a goal to be scored (high future

possibility) and the players are more likely to dwell on the future implications of the counterfactual which promotes affective assimilation - the attackers are hopeful because the near-miss signals future success whereas the defenders are fearful because it signals future failure.

It is important to note that the score was unchanged by the near-miss at goal. Hence, whilst the incident might affect the players' expectations about which team is the more likely winner at the end of the match, it has not affected their *objective proximity* to winning. The effects that temporal perspective has on the emotional consequences of this near-miss can therefore only be explained by whether the counterfactual provoked by the incident promotes affective contrast or affective assimilation. Moreover, this explanation was tested further by coding the reasons participants provided for their judgments. We predicted that past-oriented thoughts associated with affective contrast would be activated when the near-miss occurred at the end whereas future-oriented thoughts associated with affective assimilation would be activated when the near-miss occurred at the beginning.

Method

Participants

Thirty five Durham University students (16 males, 18 females, 1 failed to report gender) were recruited in the university library and paid £3 to take part.

Materials and Procedure

Participants answered questions about one of two randomly assigned versions of a story about a football match between two teams (*Flamengo* and *Sao Paulo)* in the

Brazilian Série A. Participants were told that the scores remained tied until *Flamengo* broke the defence and shot at goal narrowly missing. The participants in the high future possibility condition (FP:High) were told that the near-miss occurred eight minutes after kick-off while those in the low future possibility condition (FP:Low) were told it occurred two minutes before the end of the game. Participants were asked to rate which of the teams they thought would be in a better mood and to provide their reasons in an open-ended question.

Results and Discussion

As predicted a significantly higher proportion of participants thought the attacking team who nearly scored (*Flamengo*) would feel better than the defending team who nearly conceded (*San Paulo*) in the FP:High condition than the FP:Low condition: $\chi 2(1, N=35) = 5.04$, $p = .025$, $w = .38$. More specifically, the proportion choosing the defending team dropped from a significant majority of 76.5% in the FP:Low condition ($\chi 2(1, N=17) = 4.77$, $p = .029$, $w = .53$), to a non-significant minority of 38.9% in the FP:High condition ($\chi 2(1, N=18) = 0.89$, $p = .346$, $w = .22$). The result therefore suggests that the contrast effect, which dominates the affective experience when the near-miss occurs at the end of the game, is cancelled out (although not overridden) by the assimilation effect when the near-miss occurs at the beginning of the game.

The reasons participants provided for their choices were coded independently and blind to experimental conditions by the two authors into either past-oriented reasons (e.g., what did happen or what could have happened in the past), future-oriented reasons (e.g., the impacts of the counterfactual on the players' confidence or their perceived chance of scoring or winning), or other-reasons (neither of the two former categories)

(see Table 1 for examples). Inter-coder reliability was high (Agreement = 91.4%, Kappa = 85.5%) and any disagreements were resolved by discussion.

TABLE 1 ABOUT HERE

Supporting our prediction, a significantly higher proportion of future-oriented reasons (50% vs. 6% - $\chi 2(1, N=35) = 8.34$, $p = .004$, $w = .49$), and lower proportion of past-oriented reasons (39% vs. 77% - $\chi 2(1, N=35) = 5.04$, $p = .025$, $w = .38$) were given in the FP:High condition.

Together, these results provide evidence for the moderating effect of future possibility on people's emotional reactions to close outcomes. The presence of future possibility enhanced the strength of the assimilation effect, although the effect was not strong enough to reverse the contrast effect which dominated when future possibility was low.

The second experiment reported in this paper provided an opportunity to replicate these findings using a somewhat different scenario and design. Moreover, as well as providing a test of the mediating effects of counterfactual probability estimates, the design enabled us to test whether the "assimilation-based satisfaction reversal" demonstrated by McMullen and Markman (2002) would arise when future possibility is high.

Experiment 2

The scenario involved two contestants playing a basketball-throwing game on a TV show. Participants judged the contestants' emotional reactions to either winning or losing the game by a small or large margin.

Like Experiment 1, we expected their emotional reactions to winning or losing by the different margins to be moderated by future possibility (path *c* in Figure 1a). If this single game decides the overall winner of the contest (FP:Low) the contrast effect should dominate - the player who wins by a small margin would feel better than the player who wins by a large margin, and the player who loses by a small margin would feel worse than the player who loses by a large margin (i.e., the proximity of the win or loss produces feelings of either disappointment through activating upward counterfactuals or relief through activating downward counterfactuals). However, if the overall winner is determined by the results of several games and the players had only finished the first game (FP:High) the assimilation effect should dominate - the player who wins by a small margin would feel worse than the player who wins by a large margin, and the player who loses by a small margin would feel better than the player who loses by a large margin (i.e., although the margin they have won or lost this single game by does not affect their o*bjective proximity* to winning the overall contest because the actual scores are not carried over, the proximity of the win or loss is an indicator of their own and their opponent's future performance in the game and they may feel either fearful of losing or hopeful of winning the subsequent games if they have only just scraped or missed out on the win). Moreover, in the FP:High condition, directly comparing the emotional consequences of winning or losing by a small margin provides a test of the "assimilation-based satisfaction reversal" effect demonstrated by McMullen and Markman (2002). If the counterfactual-based assimilation effects are strong enough to produce a satisfaction reversal we would find that losing by a small margin feels better than winning by a small margin even though the winner is objectively more likely to win the overall contest.

In this experiment we also examined whether the effects of proximity on emotions could be explained by the mediating role of counterfactual probability estimates (path *ab* in Figure 1b). Tests of mediation appropriate for within-participant designs were derived from criteria outlined by Judd, Kenny, and McClelland (2001). The criteria entail the following predictions: 1) proximity (independent variable) has an effect on counterfactual probability estimates (mediator) – counterfactuals should be stronger when the winning or losing margin is small; 2) emotions (dependent variable) and counterfactual probability estimates (mediator) should be positively related to each other *within* proximity conditions; and 3) the differences in emotions *between* proximity conditions should be related to the concomitant differences in counterfactual probability estimates. We also predicted that the directions of the coefficients in 3) should be moderated by future possibility: negative if the lost game is decisive (strong upward counterfactuals worsen mood) vs. positive if the lost game is not decisive (strong upward counterfactuals improve mood), and positive if the won game is decisive (strong downward counterfactuals improve mood) vs. negative if the won game is not decisive (strong downward counterfactuals worsen mood). Statistical tests comparing the correlations obtained between the FP:High and FP:Low conditions were conducted using the formula taken from Cohen, Cohen, West, and Aiken (2003).

Method

Participants

Ninety-six undergraduate students (74 females, 22 males) from Durham University participated in the study. They received participant credits or £2 for taking part.

Materials and Procedure

Participants read about an episode of a TV game show. In this episode, contestants competed in two separate arenas located in Los Angeles and Philadelphia. The winner of each arena would win $50,000 and advance to next week's episode, with the potential to win $100,000. After several rounds, there were only two players left in each arena and the overall winner in each arena was to be determined by a basketball-throwing game. The two contestants would either play either just one round (FP:Low), or they would play best out of five (FP:High).

Participants were asked to focus either on the losing or winning contestants (Outcome:Lose/Win). In the FP:Low condition they were shown the scores of the single but decisive games, and in the FP:High condition they were shown the scores of the first games played out of the possible five. The presented scores were designed to be close in one arena and far apart in the other (order of presentation counterbalanced to remove order effects). In the Proximity:Close conditions one of three pairs of scores with a difference of 1-point was randomly presented (21-22, 17-18 or 13-14 in Outcome:Lose; 28-29, 24-25 or 20-21 in Outcome:Win). In the Proximity:Far conditions, one of three pairs of scores with a difference of 15-points was randomly presented (21-36, 17-32 or 13-28 in Outcome:Lose; 14-29, 10-25 or 6-21 in Outcome:Win). Note that the absolute scores of the losers (21, 17 or 13) or winners (29, 25 or 21) are the same across the Proximity:Close and Proximity:Far conditions.

Participants rated the extent to which the winning or losing contestant would experience each of 12 emotions ("happy", "annoyed", "satisfied", "frustrated", "pleased", "miserable", "content", "relieved", "disappointed", "proud", "elated",

"discouraged") from 0 (not at all) to -8 (extremely) for negative emotions and 0 (not at all) to +8 (extremely) for positive emotions. Ratings were highly correlated and internally reliable ($\alpha \geq .91$) and were therefore averaged to form a single score. Counterfactual probability estimates were measured by rating how likely they thought that the contestant could have won (or lost) the round that had just finished (1=extremely unlikely, 9=extremely likely).

Results and Discussion

To test whether emotional reactions to winning or losing by the different margins were moderated by future possibility, a mixed model ANOVA was conducted with outcome (Outcome:win vs. Outcome:lose) and future possibility (FP:Low vs. FP:High) as between-participant variables and proximity (Proximity:close vs. Proximity:far) as a within-participant variable. As predicted the ANOVA produced a significant three-way interaction: $F(1,92) = 13.8$, $p < .001$, $\eta_p^2 = .131$. Simple interaction tests showed that although the two-way proximity x future possibility interactions were significant within both the Outcome:win ($F(1, 46) = 9.69$, $p = .003$, $\eta_p^2 = .176$), and Outcome:lose conditions ($F(1, 46) = 5.81$, $p = .020$, $\eta_p^2 = .109$), the underlying patterns were different. These different patterns are illustrated in Table 2 which includes the results of paired-samples t-tests to test the simple main effects of proximity on affect within each future possibility condition.

TABLE 2 ABOUT HERE

The effects of proximity on affect in the Outcome:lose condition were consistent with our predictions regarding the effects of affective contrast and assimilation. The players who lost by a small margin were judged to feel significantly worse when the

game was decisive (FP:Low), but marginally better when the game was not decisive (FP:High). Whilst the bigger and statistically significant proximity effect size found in the FP:Low condition might suggest that the affective contrast effect was stronger than the corresponding affective assimilation effect in the FP:High condition, it should be noted that the mediation analyses conducted on the counterfactual probability estimates do not support this interpretation.

To follow the criteria for mediation analysis outlined earlier we tested whether the mean counterfactual probability estimates were significantly higher in the close conditions than the far conditions (criterion 1), and whether the correlations between emotions and counterfactual probability estimates *within* each proximity condition (criterion 2) and between the differences in emotions and counterfactual probability estimates *between* the close and far conditions (criterion 3) were negative in the Outcome:lose/ FP:Low and Outcome:win/FP:High conditions but. positive in the Outcome:lose/FP:High and Outcome:win/FP:Low conditions.

As shown in Table 2 in the Outcome:lose condition there is support for criterion 1 (proximity had a significant effect on counterfactual probability estimates in both future possibility conditions), but support for criteria 2 and 3 was limited to the FP:High condition in which one of the three correlations was significant in the predicted direction (i.e., *within* Proximity:Close). However, in the FP:Low condition the directions of the correlations were not consistent with the predictions from which we can conclude that there is no evidence that the effect of proximity on affect was mediated by the strength of the counterfactuals. What's more, against our prediction regarding the moderated mediation, no significant differences were found between the

strength of the correlations between the FP:Low and FP:High conditions ($Z = 1.14$, $p = .256$; $Z = 0.58$, $p = .560$ and $Z = 0.98$, $p = .327$ respectively).

More convincing evidence in support of affective assimilation comes from the Outcome:win condition even though the interaction pattern was not fully consistent with our predictions. As Table 2 illustrates, in *both* future possibility conditions, winning by a large margin was judged to be more pleasant than winning by a small margin. Although we had predicted an effect in the opposite direction in the FP:Low condition (i.e., a feeling of relief would make winning by 1-point more pleasing than winning by 15-points), the effect size in this condition was smaller than the FP:High condition. The margin of winning therefore had a bigger impact when the game was not decisive and is consistent with assimilation lessening the pleasure of the win through fear of losing the next game. Notably this interpretation gains some support from the mediation analysis. One of the two *within* proximity correlations in the FP:High condition was significantly negative as predicted (criterion 2) and, although the test was only marginally significant, the differences in emotions *between* proximity conditions were moderately related to the concomitant differences in counterfactual probability estimates (criterion 3). However, like in the Outcome:Lose condition, we did not find evidence for a moderated mediation – none of the three correlations in the FP:High condition was significantly different from their counterparts in the FP:Low condition ($Z = 0.28$, $p = .777$; $Z = 1.24$, $p = .214$ and $Z = 0.54$, $p = .587$ respectively).

Despite the evidence of assimilation on the winner's affect it was not however strong enough to produce an "assimilation-based satisfaction reversal" against the loser's affect (for which as noted previously there was a trend towards assimilation).

Contrary to the prediction that the losers should feel better than the winners when the scores are close and the game is not decisive, our results revealed the opposite: the winners were judged to feel significantly better than the losers: $F(1, 46) = 43.94$, $p < .001$, $\eta_p^2 = .490$. This finding suggests that in the scenario used in this experiment the positive or negative emotions associated with winning or losing the first game out of the possible five were stronger than any counterfactual-based assimilation-induced emotions promoted by the closeness of the outcome. Any fears (or hopes) that may have been raised by the closeness of the win (or loss) merely dampened the joy (or disappointment) – they did not override or dominate the emotional experience.

General Discussion

Our experiments demonstrated that people's emotional reactions to near-miss incidents were contingent on the level of perceived future possibility to win (or lose) the final prize. The nature of this contingency was consistent with the predictions of the REM that the absence of future possibility promotes counterfactual evaluation and affective contrast whereas the presence of future possibility promotes counterfactual reflection and affective assimilation. It is argued that overall, the two experiments provide more convincing evidence for the enhancement of affective assimilation in the presence of future possibility than McMullen and Markman (2002). While the improved (or worsened) affective well-being of the basketball team which was trailing (or leading) by a small margin in McMullen and Markman's (2002) study could be attributed to the enhanced hopefulness (or fearfulness) due to their objective proximity to winning (or losing), our experiments ruled out this alternative explanation by keeping the objective proximity to the final victories unaffected by the near-miss at goal (Experiment 1) or the winning (or losing) margin (Experiment 2). Therefore, the observed pattern of

participants' judgments of affect in our experiments can more confidently be attributed to the assimilation effect brought about by counterfactual thinking.

In addition, the psychological mechanisms underpinning the observed effect were explored in both experiments. In support of the REM, participants' free responses in Experiment 1 suggested that a temporal-focus-switching mechanism plays an important part in the observed effect of future possibility. While the presence of future possibility promoted future-oriented thinking, the absence of it promoted past-oriented thinking. Moreover, Experiment 2 provided both supporting and refuting evidence that the observed effects of proximity on emotions were mediated by counterfactual probability estimates. Firstly, as predicted close outcomes produced the strongest counterfactuals. Secondly, the results indicate that the relationship between counterfactual probability estimates and emotions is dependent on the perception of future possibility. That is, the strength of this relation seems to vary across different future possibility conditions. However, this variation was not found to be significant. The main reason for this insignificant result is that the counterfactual probability estimates were not affecting emotions in a predicted way in some of the conditions. While some correlations in the FP:High conditions were consistent with assimilation-effect domination (i.e., stronger counterfactuals produce more fear of losing or hope of winning), the correlations in the FP:Low conditions were not consistent with affective contrast-effect domination (i.e., stronger counterfactuals did not produce more joy at winning or disappointment at losing).

These findings highlight the benefits of using mediation analysis to test the proposed mechanisms underpinning observed effects. It not only provides insights into when and how strongly people's affective responses to near-misses are shaped by

counterfactuals, but also indicates the necessity of considering alternative explanations when the mediation tests fail to lend any support to the proposed mechanisms. For example, for the losers in the FP:Low condition, although proximity was influencing affect in the predicted direction (i.e., close scores worsened people's mood), this effect was not found to be mediated by counterfactual probability ratings (i.e., the correlation between counterfactual probability estimates and emotions was in the opposite direction of the total effect of proximity on emotions). This leads to the speculation that in this condition proximity was affecting people's mood via other mechanisms.

One of these mechanisms could be a psychological process called social comparison. Festinger (1954) posits that people evaluate the validity or the appropriateness of their attitudes, beliefs or abilities by making inter-individual peer comparisons. Although the participants in our experiment were not real actors in the given situation, our scenario featured a one-on-one sports competition which may have encouraged the participants to draw inter-individual comparisons between the competitors. The Self-evaluation Maintenance model of social behaviour (SEM) (Tesser 1988) hypothesized that the motivation to engage in self-evaluation raises as the perceived closeness to another performer increases, indicating that perceived similarity (on one or more dimensions) promotes social comparisons. Thus, for the players who narrowly lost the game in our experiment, the closeness between their scores and their opponents' might have been treated as an indicator that they are similar in ability (to throw basketballs) and provoked the losers to compare their current standings with the winner, resulting in an affective contrast effect and a sense of deprivation (Morse & Gergen, 1970) (e.g., "She has won $50,000 but I didn't). Akin to counterfactual thinking, social comparisons are also capable of producing assimilation effects

depending on situations (see, for example, Mussweiler , 2003), one of which could be when future possibility is present (i.e., comparing oneself with better-off others can result in self-enhancement if success is perceived to be attainable while comparing oneself with worse-off others can result in worry or fearfulness if one perceived him/herself as being vulnerable) (see Markman & McMullen, 2003 for a review). Since we did not measure the extent to which participants have engaged in social comparisons, it is not clear how and how much this psychological process might have contributed to the effect of proximity on emotions in other conditions.

Overall, the results of our mediation analyses advise future research to consider the possibility that there are multiple paths via which near-misses can affect emotions. Not only could these mechanisms be conceptually distinctive (e.g., while social comparisons occur on an inter-individual basis, counterfactual thinking involves creating a hypothetical world and comparing that with the real one), but they also might have different implications not only for the valence of the emotions evoked but also the specific types of emotions. This could be explored in future experiments by measuring people's spontaneous emotional reactions to actual near-miss events. This approach may have an advantage over scenario-based studies like ours where participants are simply asked to rate lists of predetermined affect-based adjectives. An emotion-listing technique enables researchers to identify the emotions that are most likely to be activated spontaneously in real life situations that have personal relevance to the participants. Recent research by Sweeny and Vohs (2012), for example, has demonstrated how near-miss relief is a readily identifiable emotion specifically elicited in response to narrowly avoiding a negative outcome.

Identifying the specific emotions activated also has the potential to better understand the functional basis of counterfactual thinking (Epstude & Roese, 2008). For example, whereas disappointment may strengthen people's intentions to find ways of avoiding future negative outcomes (Roese, 1994), other emotions like hopefulness may energize people in committing to their goals particularly when contrasts are drawn between their positive fantasies and the obstacles associated with the present reality (Oettingen et al., 2009).

References

Cohen, J., Cohen, P., West, S.G., & Aiken, L.S. (2003). *Applied multiple regression/ correlation analysis for the behavioral sciences.* Mahwah, NJ: Erlbaum

Epstude, K., & Roese, N.J. (2008). The functional theory of counterfactual thinking. *Personality and Social Psychology Review, 12,* 168-192. doi:10.1177/1088868308316091

Festinger, L. (1954). A theory of social comparison processes. *Human Relations, 7*(2), 117-140. doi:10.1177/001872675400700202

Judd, C.M., Kenny, D.A., & McClelland, G.H. (2001). Estimating and testing mediation and moderation in within-subject designs. *Psychological Methods, 6*(2), 115-134. doi:10.1037//1082-989X.6.2.115

Kahneman, D., & Tversky, A. (1982). The simulation heuristic. In D. Kahneman, P. Slovic & A. Tversky (Eds.), *Judgement under uncertainty: Heuristics and biases* (pp. 201-208). New York: Cambridge University Press.

Macrae, C. N., Milne, A. B., & Griffiths, R. J. (1993). Counterfactual thinking and the

perception of criminal behavior. *British Journal of Psychology, 84*, 221-226. doi:10.1111/j.2044-8295.1993.tb02475.x

Markman, K. D., Gavanski, I., Sherman, S. J., & McMullen, M. N. (1993). The mental simulation of better and worse possible worlds. *Journal of Experimental Social Psychology, 29*(1), 87-109. doi:10.1006/jesp.1993.1005

Markman, K. D., & McMullen, M. N. (2003). A Reflection and Evaluation Model of comparative thinking. *Personality and Social Psychology Review*, *7*(3), 244-267. doi:10.1207/S15327957PSPR0703_04

McMullen, M. N. (1997). Affective contrast and assimilation in counterfactual thinking. *Journal of Experimental Social Psychology*, *33*(1), 77-100. doi:10.1006/jesp.1996.1313

McMullen, M. N., & Markman, K. D. (2000). Downward counterfactuals and motivation: The wake-up call and the pangloss effect. *Personality and Social Psychology Bulletin, 26*(5), 575-584. doi:10.1177/0146167200267005

McMullen, M. N., & Markman, K. D. (2002). Affective impact of close counterfactuals: Implications of possible futures for possible pasts. *Journal of Experimental Social Psychology*, *38*(1), 64-70. doi:10.1006/jesp.2001.1482

Medvec, V. H., Gilovich, T., & Madey, S. F. (1995). When less is more: Counterfactual thinking and satisfaction among Olympic medalists. *Journal of Personality and Social Psychology*, *69*(4), 603-610. doi:10.1037//0022-3514.69.4.603

Medvec, V. H., & Savitsky, K. (1997). When doing better means feeling worse: The effects of categorical cutoff points on counterfactual thinking and satisfaction. *Journal of Personality and Social Psychology, 72*(6), 1284-1296. doi:10.1037/0022-3514.72.6.1284

Meyerslevy, J., & Maheswaran, D. (1992). When timing matters: The influence of temporal distance on consumers' affective and persuasive responses. *Journal of Consumer Research, 19*(3), 424-433. doi:10.1086/209312

Miller, D. T., & McFarland, C. (1986). Counterfactual thinking and victim compensation: A test of norm theory. *Personality and Social Psychology Bulletin, 12*(4), 513-519. doi:10.1177/0146167286124014

Morse, S., & Gergen, K. J. (1970). Social comparison, self-consistency, and the concept of self. *Journal of Personality and Social Psychology, 16*(1), 148-&. doi:10.1037/h0029862

Mussweiler, T. (2003). Comparison processes in social judgment: Mechanisms and consequences. *Psychological Review*, 110, 472-489. doi:10.1037/0033-295X.110.3.472

Oettingen, G., Mayer, D., Sevincer, A. T., Stephens, E. J., Pak, H., & Hagenah, M. (2009). Mental contrasting and goal commitment: The mediating role of energization. Personality and Social Psychology Bulletin, 35, 608–622. doi:10.1177/0146167208330856

Petrocelli, J. V., Percy, E. J., Sherman, S. J., & Tormala, Z. L. (2011). Counterfactual potency. *Journal of Personality and Social Psychology, 100*(1), 30-46. doi:10.1037/a0021523

Roese, N. J. (1994). The functional basis of counterfactual thinking. *Journal of Personality and Social Psychology, 66*(5), 805-818. doi:10.1037//0022-3514.66.5.805

Roese, N. J. (1997). Counterfactual thinking. *Psychological Bulletin, 121*(1), 133-148. doi:10.1037//0033-2909.121.1.133

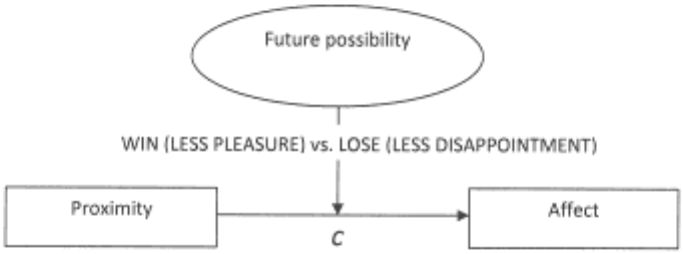
Roese, N. J., & Olson, J. M. (1996). Counterfactuals, causal attributions, and the hindsight bias: A conceptual integration. *Journal of Experimental Social Psychology, 32*(3), 197-227. doi:10.1006/jesp.1996.0010

Roese, N. J., & Olson, J. M. (1997). Counterfactual thinking: The intersection of affect and function. *Advances in Experimental Social Psychology, 29*, 1-59. doi:10.1016/S0065-2601(08)60015-5

Sweeny, K., & Vohs, K. D. (2012). On near misses and completed tasks: The nature of relief. *Psychological Science, 23*, 464–468. doi:10.1177/0956797611434590

Tesser, A. (1988). Toward a self-evaluation maintenance model of social behavior. In L. Berkowitz (Ed.), *Advances in experimental social psychology*, Vol 21, (pp. 181-227). New York: Academic Press.

a) Effect of Proximity in Winning and Losing Situations on Affect Moderated by Perceived Future Possibility



b) Mediating Effect of Counterfactual Probability Estimates Moderated by Perceived Future Possibility

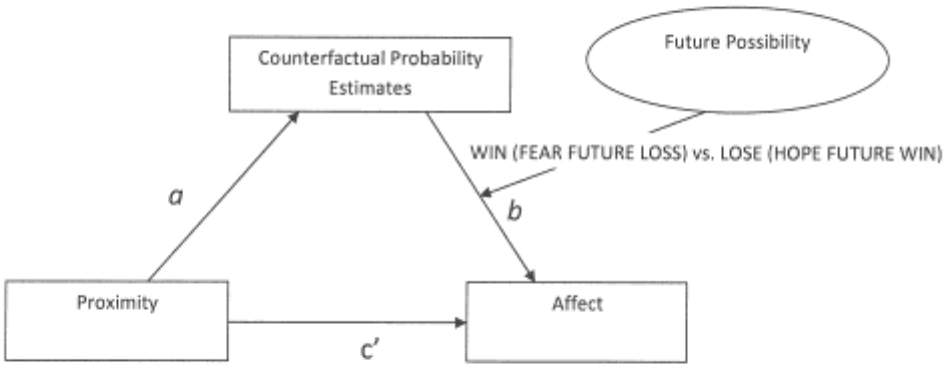


Figure 1

Illustrations of Predictions

Table 1 *Examples of Coding Categories used in Content Analysis*

Category	Examples
Past Implication	Because they (Sao Paulo) nearly lost the game at the last minute but didn't. The Flamingo players will be annoyed they missed the last chance They (Sao Paulo)manage to get 1 point out of a game they could have lost Because they (Sao Paulo) were close to losing in the last few minutes and they stayed strong and defended. They (Sao Paulo)have weathered an offensive play without conceding a goal
Future Implication	They (Flamengo) gained the advantage, breaking the defense showing it can be done scoring the opponents. Though they missed, they know it can be done . Despite having narrowly missing the target their team (Flamengo) effort was successful at breaking through the defense and taking a shot. This would give confidence to try to do it again. Also Sao Paolo may be nervous from the near miss and frustrated because of being outmaneuvered by the opposition. Whilst most of the game was even, the slight edge in better play at the end for the Flamengo players will allow then to feel they are the better side and give a psychological boost going into other games, and for the remainder of this game Because they (Flamengo) shows promising signs of winning the match. Their team is on the offense and with high spirits may well have another attack
Others	Because they (Flamengo)are in the fighting mode, which makes Sao Paulo get in a panic They (Flamengo) are showing excellent skill and teamwork.

Table 2 *The Total Effect of Proximity on Emotions and the Mediation of Counterfactual Probability Estimates across Conditions*

	Outcome:lose		Outcome:win	
	FP:Low	FP:High	FP:Low	FP:High
Proximity on affect				
Prediction	M-close < M-far (worsens mood)	M-close > M-far (improves mood)	M-close > M-far (improves mood)	M-close < M-far (worsens mood)
M-close (SD)	-2.25 (1.03)	-1.03 (1.64)	3.10 (0.76)	1.76 (1.25)
M-far (SD)	-1.78 (1.27)	-1.45 (1.38)	3.38 (0.37)	2.80 (0.76)
Effect Size (d)	-0.403*	0.274†	-0.438	-0.914***
Proximity on counterfactual probability				
Prediction	M-close > M-far (strengthens upward counterfactual)	M-close > M-far (strengthens upward counterfactual)	M-close > M-far (strengthens downward counterfactual)	M-close > M-far (strengthens downward counterfactual)
M-close (SD)	7.67 (1.24)	6.79 (1.56)	7.04 (1.57)	6.79 (1.41)
M-far (SD)	3.75 (1.70)	4.08 (1.35)	3.58 (1.53)	3.54 (1.25)
Effect Size (d)	2.62***	1.86***	2.23***	2.44***
[a] **Correlations between affect and counterfactual probability**				
Prediction	negative (strong upward counterfactuals worsen mood)	positive (strong upward counterfactuals improve mood)	positive (strong downward counterfactuals improve mood)	negative (strong downward counterfactuals worsen mood)
Within proximity conditions				
Close condition	.067	.395*	-.084	-.170
Far condition	.334	.166	-.068	-.423*
Between proximity conditions				
Close-far differences	.327	.037	-.113	-.274†

†p < .10, * p < .05, **p < .01, ***p < .001

[a]Kilmogorov-Smirnov and Shapiro-Wilk tests showed that data were not normally distributed. The coefficients obtained from non-parametric Spearman's rho tests are therefore reported.